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(54) **PLUG ASSEMBLY AND A METHOD FOR SEALING A HOLE**

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See application file for complete search history.

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(57) **ABSTRACT**

A dual stage plug assembly 10 which provides a first sealing stage which is cooperatively provided by the insertion members 12, 14 (including the unexpanded portion 24) and a second sealing stage which is provided by selectively expandable member 24. The plug assembly 10 is selectively inserted into a hole, such as hole 80, which is formed in a tangible entity, such as basement wall 82, and the members 12 and 14 cooperates with member 24 to seal the hole 80, thereby preventing water and/or other liquid from entering and passing through the hole 80.

8 Claims, 2 Drawing Sheets

Related U.S. Application Data

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E04B 1/00 (2006.01)
E04G 23/02 (2006.01)
E02D 37/00 (2006.01)

(52) **U.S. Cl.**
CPC **E04G 23/0203** (2013.01); **E02D 37/00** (2013.01)

(58) **Field of Classification Search**
CPC **E04G 23/0203**; **E02D 37/00**

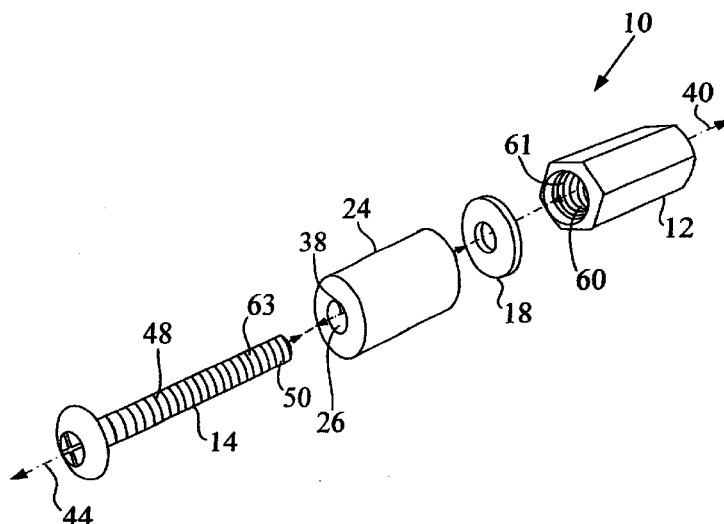


Fig. 1

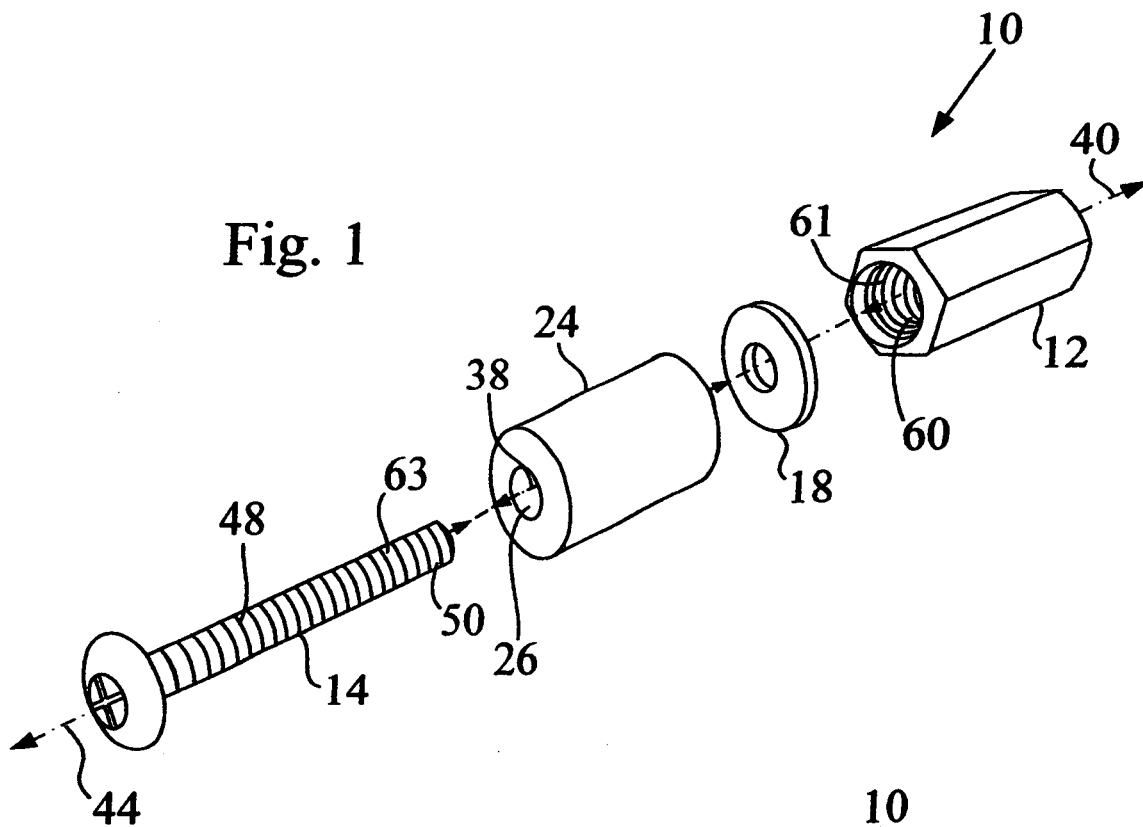


Fig. 2

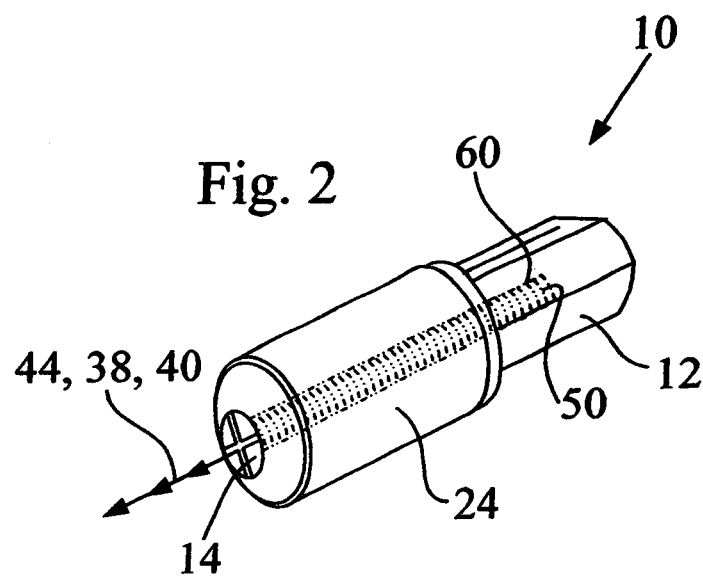
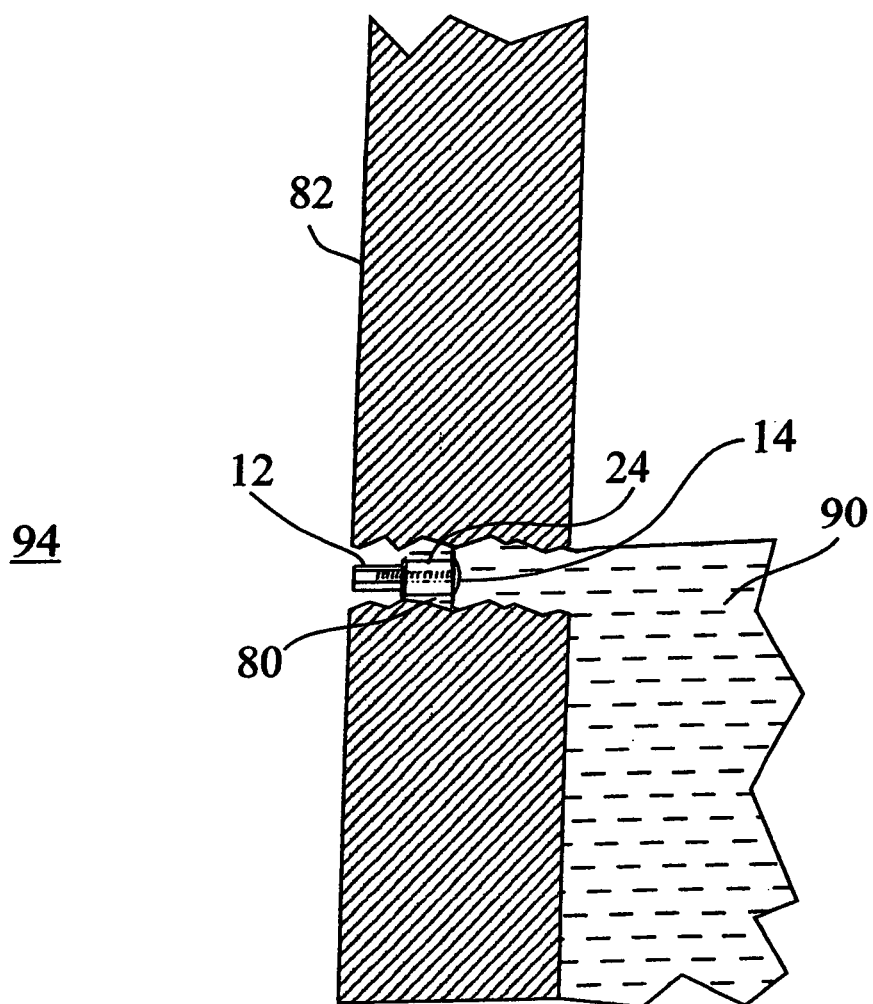


Fig. 3



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PLUG ASSEMBLY AND A METHOD FOR SEALING A HOLE

GENERAL BACKGROUND

This is a Continuation of pending U.S. application Ser. No. 13/815,384 which was filed on Feb. 27, 2013, and which was a Divisional of Ser. No. 12/807,639 which was filed on Sep. 11, 2010 and from which priority is claimed.

FIELD OF THE INVENTION

The present inventions generally relate to a plug assembly and to a method for sealing a hole and more particularly, to an assembly and a method by which a hole, such as by way of example and without limitation, a hole in a wall, is selectively sealed in a two or multi stage manner.

BACKGROUND OF THE INVENTION

Holes occur in various structures and other tangible entities, such as by way of example a wall (e.g., a basement wall). It should be appreciated that the term “hole” or “holes”, as used throughout this specification, each refer to any type of undesirable opening within a structure or other tangible entity. Such an undesirable opening may be in the form of a crack, crevice, hole, or in any other form and nothing in this description is meant to or does limit the present inventions to a particular type of opening or to a particular type of tangible entity.

These holes typically allow for the undesirable flow of water and/or other liquids into and through the structure or entity into which they occur, and such water and/or other liquids typically are then undesirably communicated into some other environment. For example, holes which occur in a basement wall typically and undesirably allow for the communication of water into a basement environment.

Various strategies have been and are employed to “plug” or seal these holes and such strategies include placing an item (e.g., a cork) into the hole and/or filling the hole with some epoxy or other material. These strategies have several drawbacks. As used in this specification the term “plug” is meant to refer to anything which acts to seal or partially seal a hole.

By way of example and without limitation, simply placing an item into the hole does not adequately seal the entire hole, and water and other liquids continue to flow through the “unsealed” portion of the hole. Placing epoxy or similar types of flowable material into the hole is time consuming, messy, and provides an overall undesirable appearance. Moreover, many of these materials are poisonous and quickly degrade over time (especially in a relatively damp environment), thereby requiring the originally placed materials to be removed and replaced:

There is therefore a need for a new and improved hole sealing or plug type assembly and to a method for sealing a hole, and the present inventions provide such a new and novel strategy which overcomes some or all of the previously delineated drawbacks.

SUMMARY OF THE INVENTION

It is a first non-limiting object of the present inventions to provide an assembly for selectively sealing a hole and which overcomes some or all of the previously delineated drawbacks of prior sealing assemblies.

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It is a second non-limiting object of the present inventions to provide a method for sealing a hole and which overcomes some or all of the previously delineated drawbacks of prior sealing methods.

According to a first non-limiting aspect of the present inventions, a plug assembly is provided and includes a first insertion portion; and a second sealing portion which is coupled to the first insertion portion.

According to a second non-limiting object of the present inventions, a plug assembly is provided and includes an insertion member having a first hardness and having a cavity and a first longitudinal axis of symmetry; a coupling member which has a body portion and a first end portion which selectively and movably resides within the cavity, wherein the coupling member includes a second longitudinal axis of symmetry which overlays the first longitudinal axis of symmetry, wherein the first end portion couples the coupling member to the insertion member; and an expansion member which expands upon contact with water and which surrounds the body of the coupling member and which further includes a third longitudinal axis of symmetry which overlays each of the first and second longitudinal axes of symmetry and wherein the expansion member has a second hardness which is less than the first hardness.

According to a third non-limiting aspect of the present inventions, a method for sealing a hole in a wall through which water flows is provided. The method includes the steps of obtaining a member; placing water expandable material about a portion of the member; forcing the member into the hole, thereby causing the member to frictionally reside within the hole; and allowing the water to contact the material, thereby allowing the material to expand within the hole, whereby the expanded material and the member cooperatively seal the hole and prevent the water from flowing through the hole.

These and other features, aspects, and objects of the various present inventions will become apparent from a reading of the detailed description of the present inventions, including by reference to the subjoined claims, and by reference to the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective unassembled view of a plug assembly which is made in accordance with the teachings of the preferred embodiment of the various inventions.

FIG. 2 is a perspective assembled view of the plug assembly (part of which is shown) which is shown in Figure

FIG. 3 is a side sectional view of wall into which the plug assembly which is shown in FIGS. 1 and 2 is selectively and operatively inserted and placed.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTIONS

Referring now to FIGS. 1 and 2, there is shown a plug assembly 10 which is made in accordance with the teachings of the preferred embodiment of the various inventions.

Plug assembly 10 includes an insertion portion 12 which, in one non-limiting embodiment, comprises a commercially available “ $\frac{1}{4}$ inch \times $\frac{7}{8}$ inch” 3 zinc plated coupling nut, and the thread count is 20. In this non-limiting embodiment, the portion 12 has a SKU of 37815 and a UNSPSC of 31161728. In this non-limiting embodiment, the diameter of portion 12 is about one quarter of an inch, the length is about $\frac{7}{8}$ of an inch, and the material forming portion 12 is steel. Alternatively, portion 12 may be obtained from the Alma Bolt Company (a

member of the ABC Fastener Group) and has a SKU number of 25UCN. Plug assembly **10** further includes a coupling member **14** which, in one non-limiting embodiment of the invention, comprises a commercially available “ $\frac{1}{4}$ inch \times 1 $\frac{1}{2}$ inch Phillips Truss Head Machine 18-8 Stainless Steel Screw” which is available from the Fastenal corporation and which has a SKU of 0170593 and a UNSPSC of 31161504. In this non-limiting embodiment, the diameter of member **14** is about $\frac{1}{4}$ of an inch, the length is about 1 $\frac{1}{2}$ inches and the thread count is 20. Alternatively, portion **14** may be obtained from the Alma Bolt Company and has a SKU Number of 25U150SSTXMS.

The plug assembly **10** further includes a flat washer **18** which, in one non-limiting embodiment of the invention, comprises a commercially available washer which is identified as a “ $\frac{1}{4}$ inch Alloy 20 Stainless Steel Flat Washer” and which is available from the Fastenal Corporation and which has a SKU of 0176288 and a UNSPSC of 31161807. In this non-limiting embodiment, the washer **18** has an inner diameter of about 0.285 inches and an outer diameter of about 0.625 inches and a thickness of about 0.050 inches. Alternatively, the washer **18** may be obtained from the Alma Bolt Company and has a SKU Number of 12SSFV.

The plug assembly **10** further includes a generally cylindrically shaped and hollow member **24** having a cavity **26**. The member **24** is adapted to expand upon contact with water and/or another type of liquid and, in one non-limiting embodiment, is constructed from commercially available material which is commonly referred to as “Hydrotite” which is available from Greenstreak, Inc of St. Louis, Miss. It should be appreciated that the member **24** has a longitudinal axis of symmetry **38**, that the insertion portion **12** has a longitudinal axis of symmetry **40**, and that the coupling member **14** has a longitudinal axis of symmetry **44**. Further, the hardness of the insertion member **12** is much greater than the hardness the member **24**.

To assemble the plug assembly **10**, the coupling member **14** is inserted into and through the cavity **26**. In this manner, the body portion **48** of the member **14** resides within the cavity **26** but the end portion **50** protrudes from the cavity **26**. The washer **18** is placed upon the protruding end portion **50** and the protruding end portion **50** is inserted into the insertion member **12**. That is, the insertion member **12** includes a threaded cavity **60** and the protruding end **50** is threaded in a complementary manner to the threads included within the cavity **60**. In this manner, the threads which are formed within the cavity **60** cooperate with the threads **63** which are formed upon the end **50** and this cooperation allows the end **50** to be selectively and “screwably” coupled to the insertion portion **50** and to fixedly remain within the cavity **60**. In this assembly, each of the individual axes of symmetry **38**, **40**, **44** respectively overlay the other axes of symmetry **38**, **40**, **44**.

In operation, should a hole, such as hole **80** occur within a tangible entity, such as within basement wall **80** (see FIG. 3), the member **14** is initially forcibly placed within the hole **80**, (most and possibly all of the assembly **10** is made to then reside within the hole **80** (see FIG. 3)), thereby providing a first stage of sealing the hole **80**. That is, the mere presence of the member **14** (and all or most of assembly **10**) within the hole **80** will slow or prevent the flow of liquid **90** into the hole **80** and through the hole **80** into the basement environment **94**. Should some of the liquid **90** still pass through the hole **80**, the flowing liquid **90** will contact the member **24** and cause the member **24** to physically expand (shown in phantom in FIG. 3) and to provided a second stage of sealing which is effective to fully seal the hole **82**. Thus the members **14** and **24** each

provide distinct and independent sealing functions and cooperatively allow the assembly **10** to provide and comprise a dual stage sealing assembly.

It is to be understood that the various inventions are not limited to the exact construction or embodiments which have been delineated above, but that various changes and modifications may be made without departing from the spirit and the scope of the following claims. It should be appreciated that the size and shape of assembly **10** (and of each of the individual components **12**, **14**, **18**, and **24** may be modified as desired). Further it should be appreciated that member **10** may be formed as a single assembly without the need for the various previously delineated individual components **14**, **12**, **18**, and **24**.

What is claimed is:

1. A method for sealing a hole in a wall, said wall including a surface which abuts a liquid which flows throw said hole, said method comprising the steps of obtaining material which selectively expands when contracted by said liquid; forming said material in a cylindrical shape having a first longitudinal axis of symmetry; obtaining an insertion member having a hardness greater than the hardness of the formed material and having exposed ends and a second longitudinal axis of symmetry, wherein said insertion member has a plurality of internal threads and a hexagonal shaped body; obtaining a threaded member having second threads which are complementary to said internal threads; causing said threaded member to traverse said formed cylindrical shaped material and engage said internal threads of said insertion member, thereby attaching said formed expandable material to one end of said insertion member, whereby said first and said second longitudinal axes of symmetry are aligned; placing said formed expandable material within said hole and proximate to said liquid wherein said insertion member is distal from said liquid and wherein said formed expandable material impedes the flow of said liquid as said liquid travels through said hole and to said insertion member, whereby said formed expandable member provides a first primary seal of said hole within said wall and impedes said flow of said liquid in a direction to said insertion member.

2. The method of claim 1 wherein said liquid comprises water.

3. The method of claim 2 wherein said member comprises a nut.

4. The method of claim 3 wherein said material is in the form of a hollow cylinder.

5. A method for sealing a hole in a wall, said wall including a surface which abuts a liquid which flows throw said hole, said method comprising the steps of obtaining material which selectively expands when contracted by said liquid; forming said material in a rounded shape having a first longitudinal axis of symmetry; obtaining an insertion member having a hardness greater than the hardness of the formed material and having exposed ends and a second longitudinal axis of symmetry, wherein said insertion member has a plurality of internal threads and is hexagonal shaped body; obtaining a threaded member having second threads which are complementary to said internal threads; causing said threaded member to traverse said formed rounded shaped material and to engage said internal threads of said insertion member, thereby attaching said formed expandable material to one end of said insertion member, whereby said first and said second longitudinal axes of symmetry are aligned; placing said formed expandable material within said hole and proximate to said liquid, wherein said insertion member is distal from said liquid and wherein said formed expandable material is positioned between said liquid and said insertion member and

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wherein said formed expandable material impedes the flow of said liquid as said liquid travels through said hole and to said insertion member, whereby said formed expandable member provides a first primary seal of said hole within said wall and at least impedes said flow of said liquid in a direction to said insertion member. 5

6. The method of claim 5 wherein said member comprises a coupling nut.

7. The method of claim 6 wherein said water expanded material is in the form of a hollow cylinder. 10

8. The method of claim 7 wherein said water expandable material is placed upon said member is forced into said hole.

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